

distance from the third signal characteristics to the second template; in accordance with a determination that the first distance is shorter than the second distance, determining that the third signal characteristics belong to the first cluster; and in accordance with a determination that the second distance is shorter than the first distance, determining that the third signal characteristics belong to the second cluster. Additionally or alternatively to the other disclosed examples, generating the first template for the first hand gesture may include storing some or all of the first sensor data as the first template, and generating the second template for the second hand gesture may include storing some or all of the second sensor data as the second template. Additionally or alternatively to the other disclosed examples, calculating the first signal characteristics may include calculating at least one of: an amplitude difference between a peak and a trough of the first sensor data, a time difference between a peak and a trough of the first sensor data, a maximum amplitude of the first sensor data, a period between peaks of the first sensor data, and a phase of the first sensor data. Additionally or alternatively to the other disclosed examples, the method may further include: filtering heart rate frequencies from the first sensor data before calculating the first signal characteristics based on the first sensor data. Additionally or alternatively to the other disclosed examples, the method may further include: during the first period in which the user performs the first hand gesture, further collecting the first sensor data from at least one of a force sensor and an accelerometer. Additionally or alternatively to the other disclosed examples, collecting the first sensor data from the plurality of photodiodes may include collecting a first channel of infrared light and collecting a second channel of green light. Additionally or alternatively to the other disclosed examples, the method may further include: during a fourth period in which the user does not perform the first or second hand gesture, collecting fourth sensor data from the plurality of photodiodes; calculating fourth signal characteristics based on the fourth sensor data; and assigning some or all of the fourth signal characteristics to the third cluster of signal characteristics. Additionally or alternatively to the other disclosed examples, assigning the first and second signal characteristics to the first and second clusters may be performed using a k-means clustering algorithm. Additionally or alternatively to the other disclosed examples, the k-means clustering algorithm may also be applied to the third signal characteristics and determining whether the third signal characteristics belong to the first cluster, the second cluster, or the third cluster may be based on the k-means clustering algorithm.

[0129] In some examples, a non-transitory computer readable medium is disclosed, the computer readable medium containing instructions, that, when executed, perform a method. The method may include: The method may include: during a first period in which the user performs a first hand gesture, collecting first sensor data from the plurality of photodiodes; during a second period in which the user performs a second hand gesture, collecting second sensor data from the plurality of photodiodes; calculating first signal characteristics based on the first sensor data and second signal characteristics based on the second sensor data; assigning some or all of the first signal characteristics to a first cluster of signal characteristics; assigning some or all of the second signal characteristics to a second cluster of signal characteristics; during a third period, collecting third

sensor data from the plurality of photodiodes; calculating third signal characteristics based on the third sensor data; determining whether the third signal characteristics belong to the first cluster, the second cluster, or a third cluster; in accordance with a determination that the third signal characteristics belong to the first cluster, determining that the user has performed the first hand gesture; in accordance with a determination that the third signal characteristics belong to the second cluster, determining that the user has performed the second hand gesture; and in accordance with a determination that the third signal characteristics belong to the third cluster, determining that the user has not performed the first hand gesture or the second hand gesture.

[0130] In some examples, an electronic device is disclosed. The electronic device may include: one or more processors; memory; a plurality of photodiodes; and one or more programs, wherein the one or more programs are stored in the memory and are configured to be executed by the one or more processors, which when executed by the one or more processors, cause the electronic device to perform a method. The method may include: during a first period in which the user performs a first hand gesture, collecting first sensor data from the plurality of photodiodes; during a second period in which the user performs a second hand gesture, collecting second sensor data from the plurality of photodiodes; calculating first signal characteristics based on the first sensor data and second signal characteristics based on the second sensor data; assigning some or all of the first signal characteristics to a first cluster of signal characteristics; assigning some or all of the second signal characteristics to a second cluster of signal characteristics; during a third period, collecting third sensor data from the plurality of photodiodes; calculating third signal characteristics based on the third sensor data; determining whether the third signal characteristics belong to the first cluster, the second cluster, or a third cluster; in accordance with a determination that the third signal characteristics belong to the first cluster, determining that the user has performed the first hand gesture; in accordance with a determination that the third signal characteristics belong to the second cluster, determining that the user has performed the second hand gesture; and in accordance with a determination that the third signal characteristics belong to the third cluster, determining that the user has not performed the first hand gesture or the second hand gesture.

[0131] Although the disclosed examples have been fully described with reference to the accompanying drawings, it is to be noted that various changes and modifications will become apparent to those skilled in the art. Such changes and modifications are to be understood as being included within the scope of the disclosed examples as defined by the appended claims.

1. A device comprising:

- a plurality of light emitters configured to emit light at a tissue of a user;
- a plurality of photodiodes configured to sense at least a portion of a reflection of the emitted light and generate sensor data indicative of movement of anatomic features in the tissue of the user;
- a plurality of channels, each channel associated with one of the plurality of light emitters and one of the plurality of photodiodes and further associated with a signal pattern including the sensor data from the respective photodiode; and